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(54) **A printer capable of decorating an edible medium**

(57) A printer capable of printing directly onto the surface of an edible medium (9) comprises a non-impact printer head assembly (1) at least one reservoir (7) containing a liquid food colourant, a surface (8) for holding said edible medium (9), and a means for supplying said head assembly (1) with printing instructions and for causing relative movement between said holding surface (8) and said head assembly (1) in accordance with the desired image to be printed.

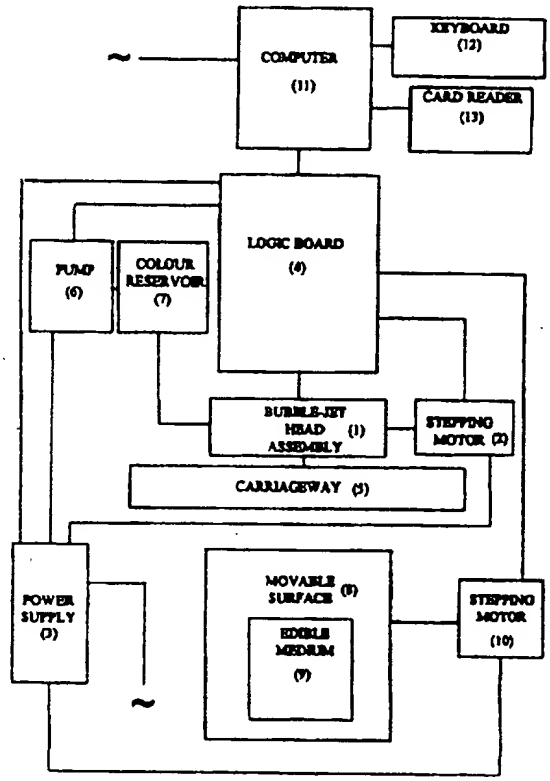

Figure 1

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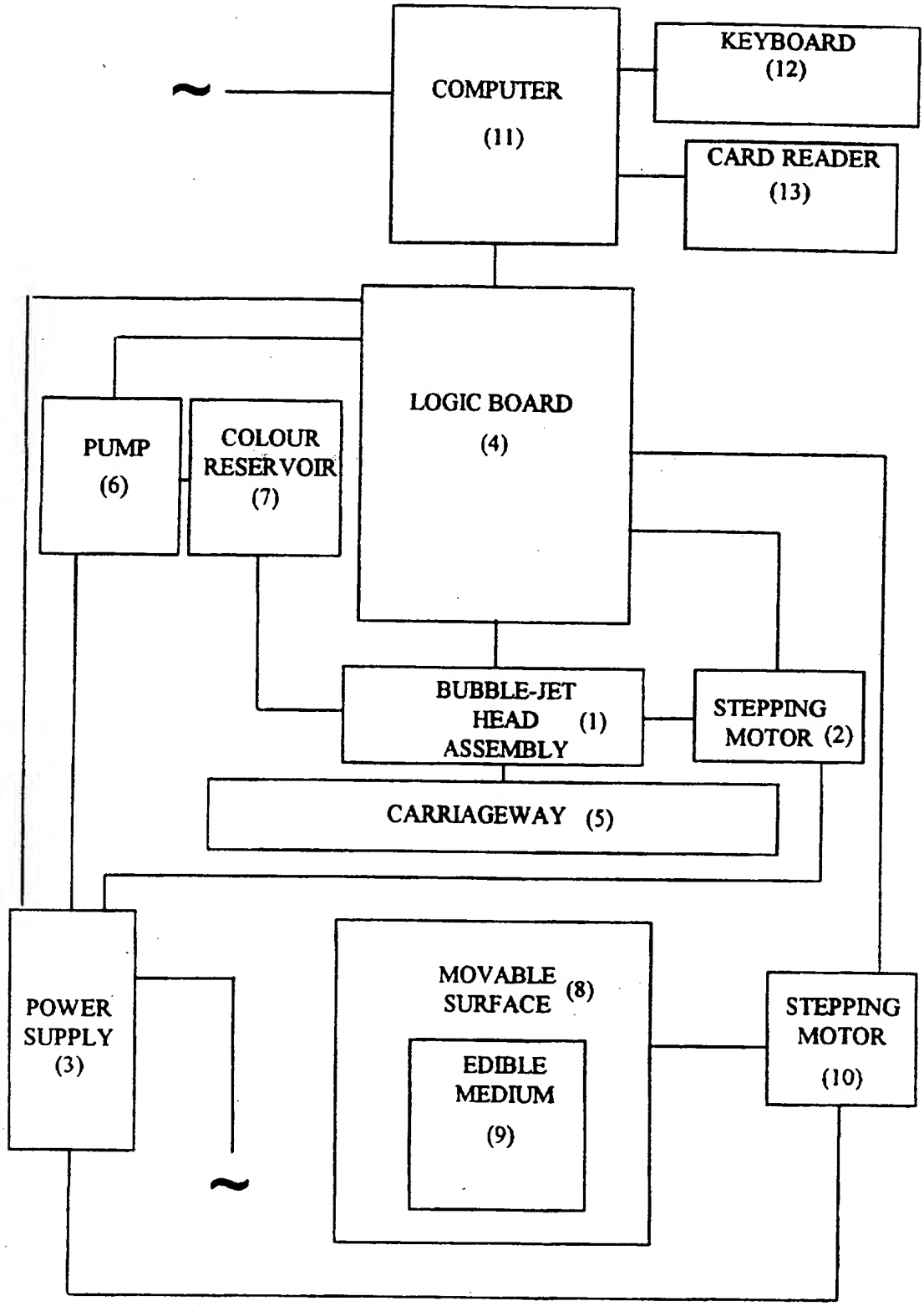
COMPUTER
(11)
KEYBOARD
(12)
CARD READER
(13)
LOGIC BOARD
(4)
PUMP
(6)
COLOUR
RESERVOIR
(7)
BUBBLE-JET
HEAD (1)
ASSEMBLY
STEPPING
MOTOR (2)
CARRIAGEWAY (5)
POWER
SUPPLY
(3)
MOVABLE
SURFACE (8)
EDIBLE
MEDIUM
(9)
STEPPING
MOTOR
(10)

Figure 1

Figure 2

FOOD DECORATION MACHINE

This invention relates to a machine that automatically reproduces a picture, pattern or text directly on to an edible medium to a size and colours determined by an operative.

Decorated cakes are well known and have been decorated by hand for many many years. Various methods are currently in use, e.g. Hand painting of the design, spraying food colouring through a stencil, cutting out shapes from soft icing or marzipan, piping designs with molten chocolate, decorative designs with a piping bag of soft icing, applying plastic or other types of novelty directly to the cake top, silk screening of images onto plaques of sugar or wafer fixed to the cake top or sides, etc. Most celebration cakes are completed by hand and rely on the skill and dexterity of the operative to achieve quality results. These types of decorated cakes are however expensive to produce because of the skilled labour involved and it is not possible with the materials and equipment currently available to produce a commercially viable product by hand with fine detail or shading.

According to the present invention there is provided a machine adapted to draw or print pictures or patterns or text directly onto the surface of an edible medium, the machine including a bubble-jet (RTM) or bubble-jet (RTM) printer head assembly, at least one reservoir containing a liquid food colourant, a surface for holding said edible medium, said surface and said head assembly being movable relative to each other, and a means for supplying the said head assembly with printing instructions and for causing said relative movement in accordance with the desired picture, pattern or text to be printed upon the edible medium.

Preferably the machine includes a computer system to store the picture, pattern or text to be printed (hereinafter referred to as the image). The images stored within the computer system may be protected by an encryption algorithm which can only be accessed by a purchaser if he first obtains from the supplier the decryption code to unscramble the images. This feature enables copyrighted characters to be offered to the purchaser whilst still being able to guarantee the copyright holder their rightful royalties based on the number of times the purchaser utilises the image.

In a preferred embodiment four reservoirs are provided each containing a food colourant of a different colour. The food colourant can of course be black, white, or any other colour, preferably however the four reservoirs contain magenta , yellow, cyan and black respectively.

In general the machine will also include associated elements such as a power supply, a control panel, logic board, and associated wiring. Any suitable means may be provided to operate the machine, e.g. A computer, keypad or pointing device. A movable surface to move the edible medium, e.g. Tray, conveyor belt, rollers.

In a preferred embodiment the surface for holding the edible medium is movable longitudinally of the machine and the bubble-jet (RTM) head assembly is movable laterally of the machine.

The machine of this invention is used in conjunction with any suitable edible medium, e.g. Royal icing, sugar paste, fresh cream, cover paste, ice cream, butter cream, wafer, rice paper, gelatine, marzipan, fondant etc.

An embodiment of the machine of the present invention will now be described, by way of example only, by reference to the accompanying drawings, in which;

Figure (1) is a diagrammatic representation of an embodiment of a machine according to the present invention; and

Figure (2) is an example of the output from the machine of figure (1)

Referring to figure (1) of the drawings there is shown a bubble-jet (RTM) head assembly (1) together with a stepping motor (2) for moving the head assembly (1). The stepping motor (2) is connected to a power supply (3). A logic board (4) controls the movement of the bubble-jet (RTM) head assembly (1) via the stepping motor (2) across the carriageway (5). A pump (6) is provided to clean the bubble-jet (RTM) head assembly (1) and deliver the liquid food colour to the bubble-jet (RTM) head assembly (1) from the ink reservoirs (7). A movable surface (8) is provided to support the edible medium (9) a stepping motor (10) is connected to a power supply (3) and a logic board (4) to advance the movable surface (8). The required image is stored on magnetic media held within the computer (11) and is accessed by entering the required image code via the keyboard, keypad or pointing device (12). If the image is copyrighted it will be protected by an encryption algorithm and may only be decrypted by means of the card reader (13). The image once selected is sent to the bubble-jet (RTM) head assembly (1) via the logic board (4) as a series of information, e.g. Bitmap, raster image, postscript or pcx file etc., which will cause the bubble-jet (RTM) head assembly (1) to move across the carriageway (5) by use of the stepping motor (2) and will then deposit colourant taken from the reservoirs (7) at predetermined positions across the top of the edible medium. As the bubble-jet (RTM) print head assembly (1) reaches the end of the carriageway (5) the stepping motor (10) will advance the edible medium (9) by moving the movable surface (8) a predetermined distance, e.g. ¼ inch. The bubble-jet (RTM) head assembly (1) will then print in the opposite

direction along the carriageway (5) until it reaches its starting position. The machine will continue the above operations until the required picture, pattern or text has been completed. By this method virtually unskilled operatives can produce decorated cakes or cake tops to a high resolution and a multiplicity of colours e.g. 360 X 360 dots per square inch and 256,000 (two hundred and fifty six thousand) different colours.

Figure (2) shows an example of the output of the machine in figure (1). It will be seen that it is an incredibly intricate picture of the Seal of the President of the United States of America. It will be seen that this is a higher quality image than has previously been obtainable on an edible medium.

The machine of this invention enables individual designs to be produced to the same or better standard than has hitherto been commercially feasible and a fraction of the labour cost.

CLAIMS

1. A machine adapted to draw or print pictures or patterns or text directly onto the surface of an edible medium, the machine including a bubble-jet or bubble-jet printer head assembly, at least one reservoir containing a liquid food colourant, a surface for holding said edible medium, said surface and said head assembly being movable relative to each other, and a means for supplying the said head assembly with printing instructions and for causing said relative movement in accordance with the desired picture, pattern or text to be printed upon the edible medium.

2. A machine according to claim 1 which includes a bubble-jet head assembly.

3. A machine according to claim 1 which includes an ink-jet head assembly.

4. A machine as claimed in any preceding claim wherein the edible medium is movable longitudinally of the machine and the head is movable laterally of the machine.

5. A machine as claimed in any one of claims 1-3 above wherein the edible medium is movable laterally of the machine and the head is movable longitudinally of the machine.

6. A machine as claimed in any preceding claim which includes a computer system.

7. A machine as claimed in any preceding claim which is adapted to be operated from a keyboard, keypad or pointing device.

8. A machine as claimed in any preceding claim which is adapted to control the use of any copyrighted images within the system.

9. A machine as claimed in any preceding claim which is adapted to monitor for a copyright holder the number of uses of their respective characters.

10. A machine as claimed in any preceding claim adapted to re-size any image.

11. A machine as claimed in any preceding claim adapted to change the colour of any image.

12. A machine as claimed in any preceding claim in which means are provided to limit the ability to recolour images which are covered by copyright.

13. A machine adapted to draw or print any picture or pattern or text directly on to the surface of an edible medium, substantially as herein before described, with reference to figure (1) of the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

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(ii) Int Cl (Ed.6) B41F: 17/00, 17/36 B41J: 3/28. 3/407

Search Examiner
MR G D WILLIAMS

Date of completion of Search
4 OCTOBER 1995

Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) WPI(ONLINE DATABASE)

Documents considered relevant following a search in respect of Claims :-
1-12

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2074947	(THOMAE) see page 1, lines 6-11 and lines 37-62 and page 2, lines 62-68	1
A	WO 88/05725	(ACKLEY) see whole document	1
X	WPI Abstract Accession No. 87-291864/42 and CH 662358 (BUTTNER) 03.09.87 (see abstract)		1

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